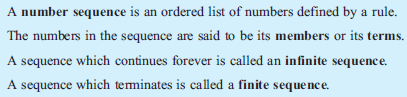
Class notes:

|  |  |  |
| --- | --- | --- |
| Syllabus Reference | Textbook reference | Content |
| 1.1 | Chapter 6:  Sequences and series | A) Number sequences  B )The general term of a number sequence  C) Arithmetic sequences  D) Geometric sequences  E) Series  F) Arithmetic series  G) Geometric series |

1. NUMBER SEQUENCES

In mathematics, it is important that we can:

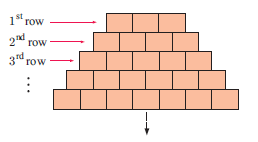
**Recognize** a pattern in a set of numbers, **describe** the pattern in words, and **continue** the pattern.



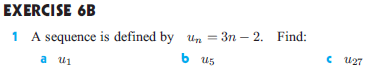
1. THE GENERAL TERM OF A NUMBER SEQUENCE

Sequences may be defined in one of the following ways:

1. listing all terms (of a finite sequence)
2. listing the first few terms and assuming that the pattern represented continues indefinitely
3. giving a description in words
4. using a formula which represents the general term or nth term

Ex. Express the following sequence in the general term

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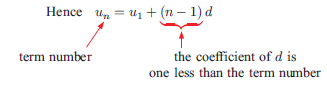


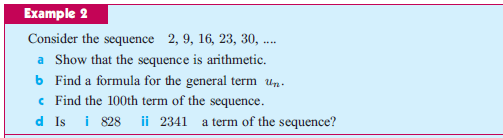
1. ARITHMETIC SEQUENCES

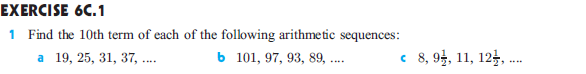


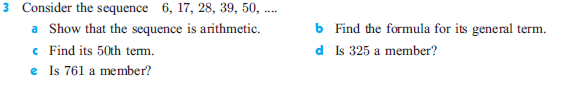
Ex:

THE GENERAL TERM FORMULA



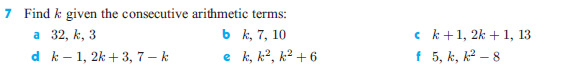


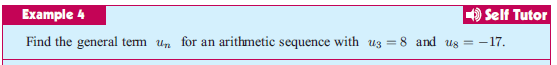


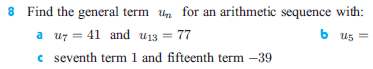


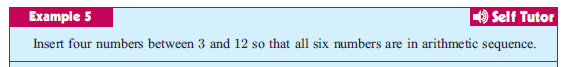




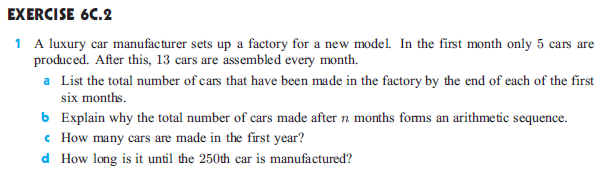


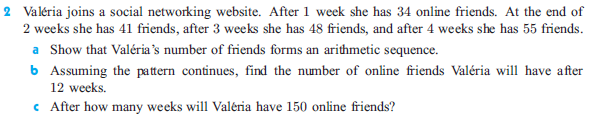






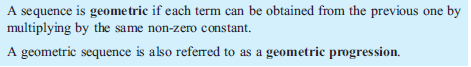






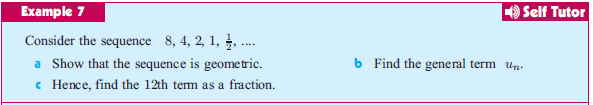
1. GEOMETRIC SEQUENCES

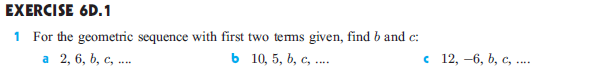
For example: 2, 10, 50, 250, .... is a geometric sequence as each term can be obtained by multiplying the previous term by\_\_\_\_\_\_











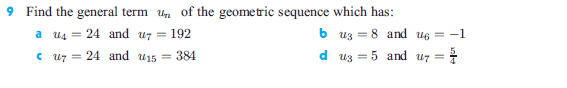






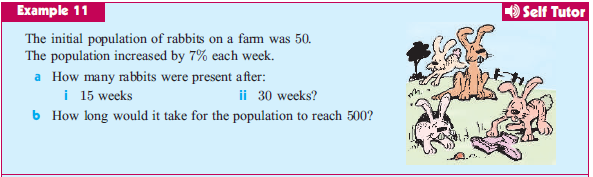


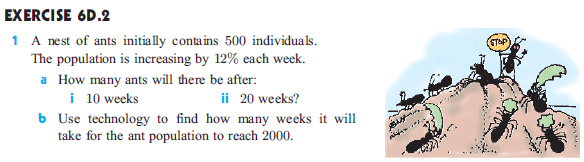


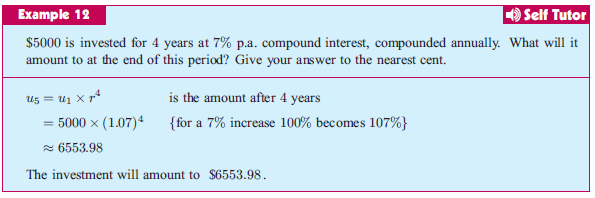


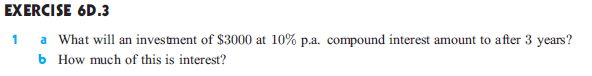
GEOMETRIC SEQUENCE PROBLEMS

Problems of growth and decay involve repeated multiplications by a constant number. We can therefore use geometric sequences to model these situations.



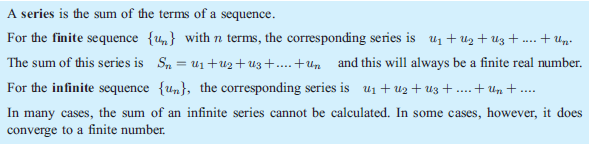


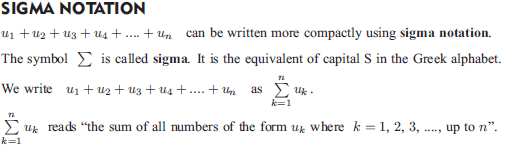


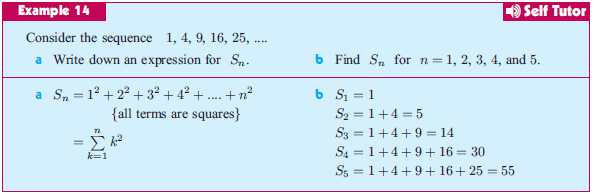


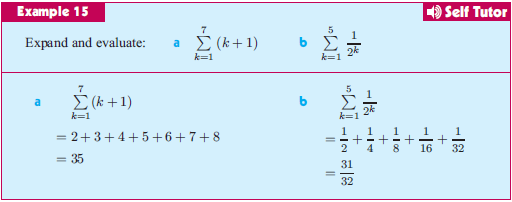
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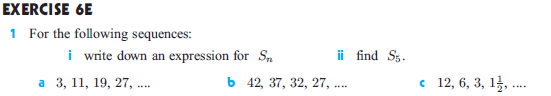
1. SERIES

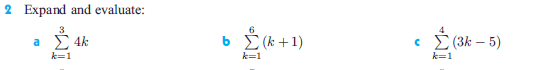




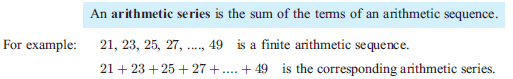


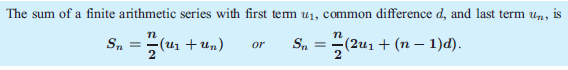


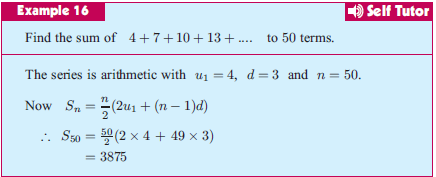


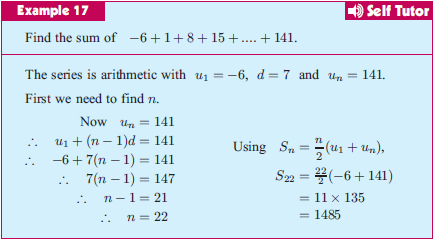


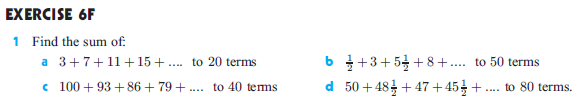
1. ARITHMETIC SERIES

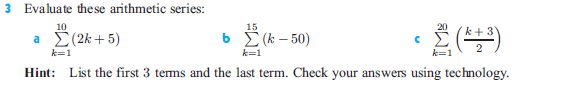




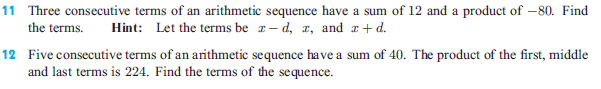




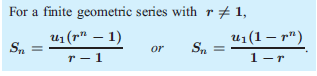
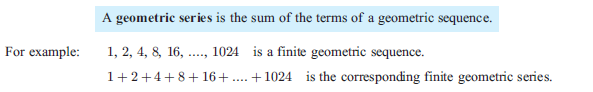






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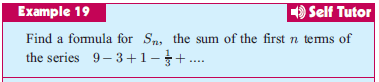
1. GEOMETRIC SERIES

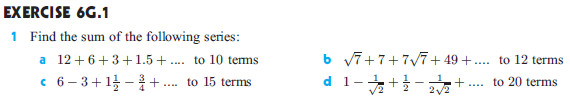


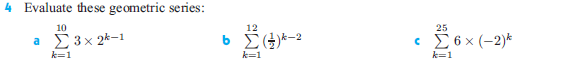


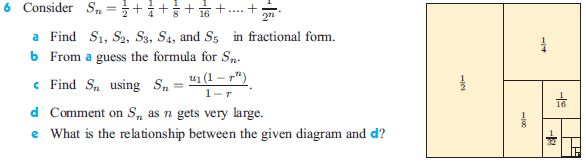
Proof:











**Infinite Geometric Series**

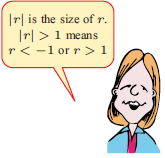
An **infinite** **geometric series** is the sum of all the terms from an infinite geometric sequence. The symbol for such a sum is .

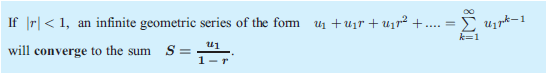
It is natural to assume that if we keep adding terms “forever” the sum would keep increasing without bound and for many geometric series this is true. We call these **divergent series**.

ex.

However, there are some series that approach a fixed value. For this to happen the terms being added must get smaller and smaller. Therefore, the common ratio must be such that . We call these **convergent series**.

ex.





Determine whether each infinite geometric series is convergent or divergent. State the sum, if it exists.

1. (b) (c)



